What is claimed is:

1. A transmission direction switching device for a half-duplex communication apparatus, said half-duplex communication apparatus including a universal asynchronous receiver transmitter (UART) and a half-duplex communication interface driver having a signal subtraction function and connected to said UART via a sending line and to said transmission direction switching device via a direction control line; said transmission direction switching device comprising:

a data transmission detector coupled to said sending line for detecting any data to be sent and sending said data if such data exists; and

a direction-switching rule executor for receiving said data sent out by said data transmission detector, and sending a direction switching signal via said direction control line to said half-duplex communication interface driver to set a transmission direction of said half-duplex communication interface driver to a sending direction when said data received from said data transmission detector is a signal 0 or a low signal, or sending a direction

switching signal via said direction control line to said half-duplex communication interface driver to set a transmission direction of said half-duplex communication interface driver to a receiving direction when said data received from said data transmission detector is a signal 1 or a high signal.

2. The transmission direction switching device as claimed in claim 1, wherein said half-duplex communication interface driver comprises a driver in compliance with RS485 standard.

3. The transmission direction switching device as claimed in claim 1, wherein said transmission direction switching device is a programmable logic device.

4. A transmission direction switching device for a half-duplex communication apparatus, said half-duplex communication apparatus including a universal asynchronous receiver transmitter (UART) and a half-duplex communication interface driver having a signal subtraction function and connected to said UART via a sending line and to said transmission direction switching device via a direction control line; said transmission direction

switching device comprising:

a data transmission detector coupled to said sending line for detecting any data to be sent and sending said data if such data exists; and

a direction-switching rule executor for receiving said data sent out by said data transmission detector and generating a negative data in reverse to said data received from said data transmission detector; and said direction-switching rule executor sending a direction switching signal via said direction control line to said half-duplex communication interface driver to set a transmission direction of said half-duplex communication interface driver to a sending direction when said negative data is a signal 0 or a low signal, or sending a direction switching signal via said direction control line to said half-duplex communication interface driver to set a transmission direction of said half-duplex communication interface driver to a receiving direction when said negative data is a signal 1 or a high signal.

5. The transmission direction switching device as claimed in claim 4, wherein said half-duplex

communication interface driver comprises a driver in compliance with RS485 standard.

6. The transmission direction switching device as claimed in claim 4, wherein said transmission direction switching device is a programmable logic device.

7. A method for switching transmission direction of a half-duplex communication apparatus, said half-duplex communication apparatus including a universal asynchronous receiver transmitter (UART), a half-duplex communication interface driver having a signal subtraction function, and a transmission direction switching device; said half-duplex communication interface driver being connected to said UART via a sending line and to said transmission direction switching device via a direction control line; and said transmission direction switching device including a data transmission detector and a direction-switching rule executor; said method comprising the steps of:

detecting any data transmission by using said data transmission detector coupled to said sending line to detect any data to be sent and sending said data

if such data exists; and

implementing transmission direction switching by using said direction-switching rule executor to receive said data sent by said data transmission detector, such that said direction-switching rule executor sends a direction switching signal via said direction control line to said half-duplex communication interface driver to set a transmission direction of said half-duplex communication interface driver to a sending direction when said data received from said data transmission detector is a signal 0 or a low signal, or sends a direction switching signal via said direction control line to said half-duplex communication interface driver to set a transmission direction of said half-duplex communication interface driver to a receiving direction when said data received from said data transmission detector is a signal 1 or a high signal.

8. The method for switching transmission direction as claimed in claim 7, wherein said half-duplex communication interface driver comprises a driver in compliance with RS485 standard.

9. The method for switching transmission direction as

claimed in claim 7, wherein said transmission direction switching device is a programmable logic device.

10. A method for switching transmission direction of a half-duplex communication apparatus, said half-duplex communication apparatus including a universal asynchronous receiver transmitter (UART), a half-duplex communication interface driver having a signal subtraction function, and a transmission direction switching device; said half-duplex communication interface driver being connected to said UART via a sending line and to said transmission direction switching device via a direction control line; and said transmission direction switching device including a data transmission detector and a direction-switching rule executor; said method comprising the steps of:

detecting any data transmission by using said data transmission detector coupled to said sending line to detect any data to be sent and sending said data if such data exists; and

implementing transmission direction switching by using said direction-switching rule executor to

receive said data sent by said data transmission detector and generate a negative data in reverse to said data received from said data transmission detector, such that said direction-switching rule executor sends a direction switching signal via said direction control line to said half-duplex communication interface driver to set a transmission direction of said half-duplex communication interface driver to a sending direction when said negative data is a signal 0 or a low signal, or sends a direction switching signal via said direction control line to said half-duplex communication interface driver to set a transmission direction of said half-duplex communication interface driver to a receiving direction when said negative data is a signal 1 or a high signal.

11. The method for switching transmission direction as claimed in claim 10, wherein said half-duplex communication interface driver comprises a driver in compliance with RS485 standard.

12. The method for switching transmission direction as claimed in claim 10, wherein said transmission direction switching device is a programmable logic device.